# CONTACTLESS HUMIDITY/CHEMICAL VAPOR SENSOR DEVICE AND ASSOCIATED METHOD OF FABRICATION

## ABSTRACT OF THE DISCLOSURE

The invention provides a contactless sensor device operable for sensing water vapor or a predetermined chemical vapor including a thin film, wherein the thin film includes a nanostructured sensing layer and a soft magnetic layer disposed directly adjacent to the nanostructured sensing layer. The thin film has a first mass, a first density, and a first magnetostrictive resonance frequency prior to the nanostructured sensing layer adsorbing a predetermined amount of a predetermined vapor and a second mass, a second density, and a second magnetostrictive resonance frequency subsequent to the nanostructured sensing layer adsorbing the predetermined amount of the predetermined vapor. The sensor device also includes a driving coil disposed indirectly adjacent to and at a predetermined distance from the thin film, the driving coil operable for generating an alternating-current magnetic field used to query a shift in the magnetostrictive resonance frequency of the thin film. The sensor device further includes a measuring coil disposed indirectly adjacent to and at a predetermined distance from the thin film, the measuring coil operable for measuring and quantifying the shift in the magnetostrictive resonance frequency of the thin film.